

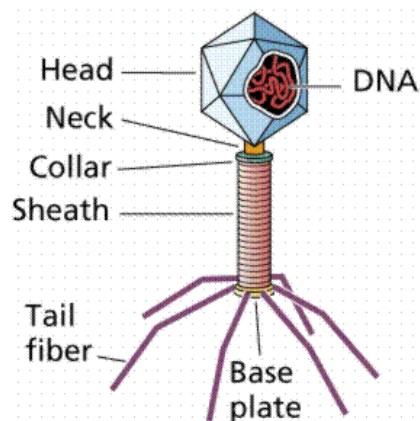
Lecture 8

Bacteriophages

Bacteriophages, also known as phages, are viruses that infect bacteria. These phages also require a bacterial host in order to replicate themselves. Bacterial viruses, as these are also often called, are made up of proteins that coat an inner core of nucleic acid – either DNA (deoxyribonucleic acid) or RNA (ribonucleic acid). Phages also vary in structure, ranging from the simple to the more elaborate and complex.

T-phages have

- Icosahedral heads
- Double-stranded DNA
- Tails



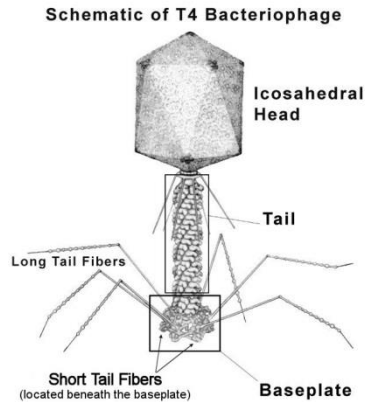
T-phages

T-phages are a specific class of bacteriophages with icosahedral heads, double-stranded DNA, and tails. The most commonly studied T-phages are T4 and T7, both of whom infect *E. coli*, everybody's favorite laboratory bacterium. They resemble microscopic arthropods, with a head composed of 20 triangular surfaces, a tail, and limb-like tail fibers.



T-4 Bacteriophage Structure

T-4 bacteriophage is a relatively large phage, at approximately 90 nm wide and 200 nm long (most phages range from 25 to 200 nm in length). The DNA genome is held in an icosahedral head, also known as a capsid. The T4's tail is hollow so that it can pass its nucleic acid into the cell it is infecting after attachment.



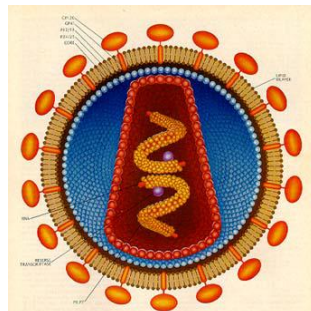
Retroviruses

Characteristics of Retroviruses

A retrovirus is a single-stranded positive-sense RNA virus with a DNA intermediate and, as an obligate parasite, targets a host cell. Once inside the host cell cytoplasm, the virus uses its own reverse transcriptase enzyme to produce DNA from its RNA genome — the reverse of the usual pattern, thus *retro* (backwards). This new DNA is then incorporated into the host cell genome by an integrase enzyme, at which point the retroviral DNA is referred to as a provirus. Retroviridae is a family of enveloped viruses that replicate in a host cell through the process of reverse transcription.

Enzyme Reverse Transcriptase

Reverse transcriptases are enzymes encoded in retroviruses viral genome. The enzyme is responsible for transcription of the viral RNA to produce a dsDNA that can be inserted into the host genome. Viral RNA is used as a template.



Retroviruses Examples

- HIV, the AIDS virus, is a retrovirus.
- Feline Leukemia Virus is also a retrovirus.

Viroids & Prions

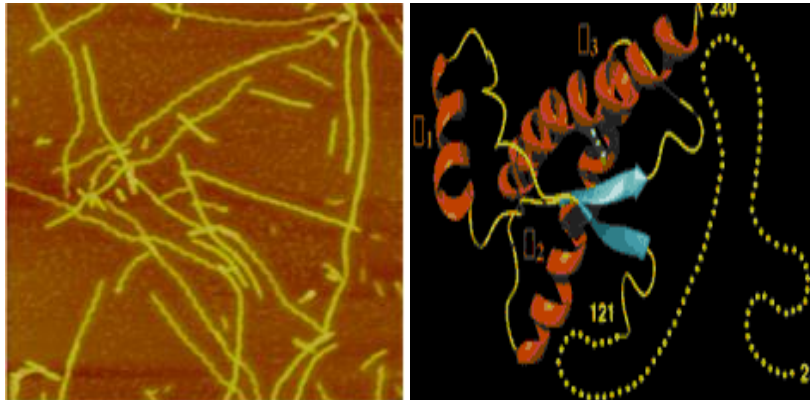
Viroids

Viroids are among the smallest infectious pathogens known, larger only than prions, which are misfolded proteins. Viroids consist solely of short strands of circular, single-stranded RNA without protein coats. They are mostly plant pathogens, some of which are of economic importance. Viroid genomes are extremely small in size, ranging from 246 to 467 nucleobases.



Prions

Prions are infectious proteins cause of the transmissible spongiform encephalopathies (TSEs). They are normal body proteins that undergo an altered configuration by contact with other prion proteins. They have no DNA or RNA. The protein involved in mammals prion diseases is called “PrP,



References:

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- <https://www.zeuscat.com/andrew/personal/info/tphage/>
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- <http://www.worthington-biochem.com/hivrt/default.html>
- <https://en.wikipedia.org/wiki/Viroid>
- <https://en.wikipedia.org/wiki/Prion>